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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/525,707	03/14/2000	Monty M. Denneau	Y0999-493-(8728-334)	9035

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EXAMINER	
ENGLAND, DAVID E	

ART UNIT	PAPER NUMBER
2143	14

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/525,707	Applicant(s) DENNEAU ET AL.	
	Examiner David E. England	Art Unit 2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 – 9 are presented for examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi et al. (5826033) (hereinafter Hayashi) in further view of Birrittella et al. (5737628) (hereinafter Birrittella).

3. Referencing claim 1, as interpreted by the Examiner, Nugent teaches a method for routing packets on a linear array of N processors connected in a nearest neighbor configuration, comprising the steps of:

4. for each axis required to directly route a packet from a source to a destination processor, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18),

5. determining whether a result of directly sending a packet from an initial processor to a target processor is less than or greater than a number of moves, respectively, the initial processor being the source processor in a first axis, the target processor being the

destination processor in a last axis, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18);

6. directly sending the packet, when the result is less than a number of moves, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18); and

7. indirectly sending the packet so as to follow at least one of the wrapped paths, when the result is greater than a number of moves, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18). Nugent does not specifically teach a number of moves equaling N/2, and

8. for each row and column of the array, connecting unused outputs of an end processor to corresponding unused inputs of the same end processor so as to create a wrapped path at each end processor of the array. Hayashi teaches a number of moves equaling N/2, (e.g. col. 9, lines 27 – 38 & col. 16, lines 29 – 56). It would have been obvious to one skilled in the art at the time the invention was made to combine Hayashi with Nugent because using algorithms to modify data transmission is a common practice among network devices to make a system more efficient in the manner it transmits data. Therefore, utilizing an algorithm would make a system more efficient in finding that fastest path for data transmission. Hayashi does not specifically for each row and column of the array, connecting unused outputs of an end processor to corresponding unused inputs of the same end processor so as to create a wrapped path at each end processor of the array.

9. Birrittella teaches for each row and column of the array, connecting unused outputs of an end processor to corresponding unused inputs of the same end processor so as to create a wrapped path at each end processor of the array, (e.g. col. 9, lines 9 – 38,

"negative directions", & col. 16, line 50 – col. 17, line 27, *"Each node had four outgoing arrows (one to each of the possible destinations for a message: the other three nodes and itself) and four incoming arrows."*, col. 18, line 63 – col. 19, line 30 & Figures 9 – 13, 24 – 26). It would have been obvious to one skilled in the art at the time the invention was made to combine Birrittella with the combine system of Nugent and Hayashi because it would be more efficient for a system to utilize unused ports that could be connected to other ends of the system changing the linear or cube shaped network to a torus, "doughnut" shape that could result in faster transmission of data that is located on the on the further end of the system. Furthermore, having end processors connected to itself could aid in stopping a packet from traversing a link to another end processor that is down by redirecting the packet back to itself while counting the same number of hops it would have traversed if the packet traveled across the network to another end processor.

10. Referencing claim 2, Nugent teaches packets are routed along the x-axis, then the y-axis, and finally the z-axis, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18).

11. Referencing claim 3, as interpreted by the Examiner, Nugent does not specifically teach the step of randomly sending the packet using either of said sending steps, when the result is equal to N/2 moves and N is an even number. Hayashi teaches the step of randomly sending the packet using either of said sending steps, when the result is equal to N/2 moves and N is an even number, (e.g. col. 9, lines 27 – 38 & col. 16, lines 29 – 56). It would have been obvious to one skilled in the art at the time the invention was made to

combine Hayashi with Nugent because it would be more convenient for the system when the algorithm is equal, it would not make a difference in which direction the data was sent because it is equal distance and no matter which way the data is transmitted the data will arrive at the same time.

12. Referencing claim 4, as interpreted by the Examiner, Nugent and Hayashi do not specifically teach said indirectly sending step comprises the step of initially sending the packet in an opposing direction with respect to the target processor, following the wrapped path of a first end processor, proceeding through the array of processors toward a second end processor, following the wrapped path of the second end processor, and proceeding to the target processor. Birrittella teach said indirectly sending step comprises the step of initially sending the packet in an opposing direction with respect to the target processor, following the wrapped path of a first end processor, proceeding through the array of processors toward a second end processor, following the wrapped path of the second end processor, and proceeding to the target processor, (e.g. col. 9, lines 9 – 38, *"negative directions"*, & col. 16, line 50 – col. 17, line 27, *"Each node had four outgoing arrows (one to each of the possible destinations for a message: the other three nodes and itself) and four incoming arrows."*, col. 18, line 63 – col. 19, line 30 & Figures 9 – 13, 24 – 26). It would have been obvious to one skilled in the art at the time the invention was made to combine Birrittella with the combine system of Nugent and Hayashi because of similar reasons stated above and it would be more efficient and faster for a system to indirectly send the data and have it "wrap around" a processor if the distance of the data traversing an indirect route is shorter then traveling a longer route taking a direct route.

13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Birrittella (5737628) in further view of Ganmukhi et al. (6449667) (hereinafter Ganmukhi).

14. Referencing claim 5, as interpreted by the Examiner, Nugent, Hayashi and Birrittella do not specifically teach the step of the target processor receiving the packet upon a second pass thereby, when the packet is sent indirectly. Ganmukhi teaches the step of the target processor receiving the packet upon a second pass thereby, when the packet is sent indirectly, (e.g. col. 7, line 11 – col. 8, line 64). It would have been obvious to one skilled in the art at the time the invention was made to combine Ganmukhi with the combine system of Nugent, Hayashi and Birrittella because it is common for a network in a tree architecture to pass through a parent node more then once in the transfer of data to and from another network device.

15. Claims 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Birrittella (5737628) in further view of Ritter et al. (5570084) (hereinafter Ritter).

16. Referencing claim 6, as interpreted by the Examiner, Nugent, Hayashi and Birrittella do not specifically teach the step of adding a 0-bit or a 1-bit to the packet, depending on whether the packet is to be injected into a corresponding axis in the positive or the negative direction, respectively. Ritter teaches the step of adding a 0-bit or

a 1-bit to the packet, depending on whether the packet is to be injected into a corresponding axis in the positive or the negative direction, respectively, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Birrittella because it would be more efficient for a system to utilize the functionality of a network protocol and place in a header a direction field/bit and attach the header to the packet so other network devices can read the packet header and know which direction to send it to get to it's destination.

17. Referencing claim 7, as interpreted by the Examiner, Nugent, Hayashi and Birrittella do not specifically teach the packet can only be removed when traveling in the positive direction, if the 0-bit is added thereto. Ritter teaches the packet can only be removed when traveling in the positive direction, if the 0-bit is added thereto, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Birrittella because it would be more efficient when a packet reaches a node that ends its travel on an axis and has to travel on another axis to get to its destination node, to have to change the field that determines the direction for the packet to travel. Therefore, removing the packet from the header, changing the header information and reattaching the header to the packet so it can be transmitted to the destination node.

18. Referencing claim 8, as interpreted by the Examiner, Nugent, Hayashi and Birrittella do not specifically teach the packet can only be removed when traveling in the negative direction, if the 1-bit is added thereto. Ritter teaches the packet can only be removed when traveling in the negative direction, if the 1-bit is added thereto, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Birrittella because of similar reasons stated above.

19. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Birrittella (5737628) in further view of Ritter et al. (5570084) (hereinafter Ritter) in further view of Ganmukhi (6449667).

20. Referencing claim 9, as interpreted by the Examiner, Nugent, Hayashi, Birrittella and Ritter do not specifically teach the step of placing the packet in a first queue or a second queue, depending on whether the 0-bit or the 1-bit is added to the packet, respectively. Ganmukhi teaches the step of placing the packet in a first queue or a second queue, depending on whether the 0-bit or the 1-bit is added to the packet, respectively, (e.g. cols. 35 – 38). It would have been obvious to one skilled in the art at the time the invention was made to combine Ganmukhi with the combine system of Nugent, Hayashi, Birrittella and Ritter because it would be more efficient to have separate transmission queue that have a specific function as apposed to having one queue and switching modes

every time a different packet enters the queue. Therefore, creating a faster system to transmit data across the network.

Conclusion

21. Applicant's arguments with respect to claims 1 – 9 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David E. England whose telephone number is 703-305-5333. The examiner can normally be reached on Mon-Thur, 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Wiley can be reached on 703-308-5221. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DE

David E. England
Examiner

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